

APOLOGIES are in order to all because I didn't give the games REVERSE and SIMON a good going-over before printing them, and there are a number of errors. Since then, Brett has also managed to simplify SIMON, and the corrections to both appear later on. By the way, unless you fellows and gals are really desperate, I think that questions, etc., by mail would be more completely answered by the contributors instead of by telephone.

SYMBOLS that I have been using may have caused some confusion. Firstly, I slid into using an asterisk * for the multiplication sign in the hand-written programs last issue, forgetting that there is an asterisk symbol on the keypad. From now on I will use a small x for multiplication. Next, the symbol # is sometimes used for the 'not equals' or ≠ (because it takes only one key stroke of the typewriter). In the Bally, this does mean 'not equals' when preceded by IF, and it is also used to describe a format convention for the tabulation function when preceded by PRINT. Symbol Ø is used for the numeral zero to avoid confusion with the letter 'O'. Symbol 7 is sometimes used for the numeral seven.

UTILIZATION of the Bally by one of our subscribers is unique. They operate a TV booster system, capturing long distance TV signals on mountain tops and rebroadcast them into valleys that normally lie in a 'shadow'. The Bally is used to insert 'commercials'. and programs are developed using the graphics capability to generate logos, and the &(9) and &(10) are used for screen wipes, color changes, etc.

SEMINARS are being planned at a couple of locations, being developed by local dealers. One is being considered in Indiana where all levels of users would be accommodated, while the other is a bit farther along. This group will be having a get-together at 2pm on May 12 at the Computer Center, 28251 Ford Rd. Garden City, MI, (422-2570).

TRANSLATIONS of the various BASIC dialects are contained in the new book, The BASIC Handbook by David Lien, published by CompuSoft Publishing Co., P.O. Box 19669, San Diego, CA 92119, for \$14.95 + 1.35 post + CA tax. I understand that it has 250 statements in BASIC with their meanings, plus conversion ideas to other dialects. There is a review in the April issue of Creative Computing, p.143; and an ad in May Kilobaud, p.81.

PROJECTS Who is working on what - and what is your status? We'll get some of you together so's you only invent the wheel once. Have any of you been able to use another computer's printing facility to list out the Bally programs?

MENU as mentioned last time was brought up with a little program, but I've had notes that plain CALL 3172 or CALL 3177 will do it.

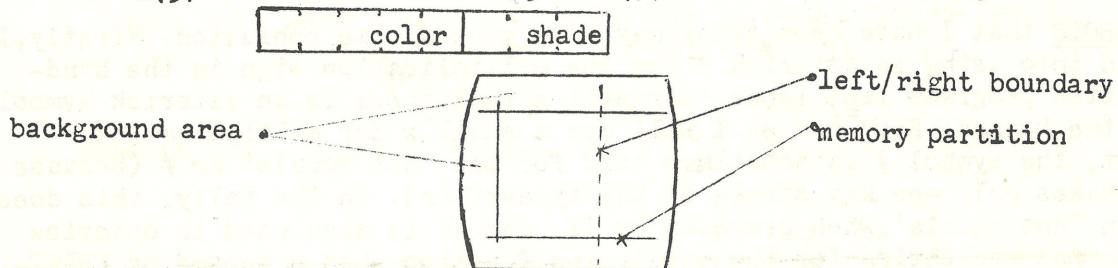
TUTORIALS (Hows and whys) are needed in the ARCADIAN in order that we can learn more about the machine and its operation. The talents of our subscribers run the gamut from the tyro to the professional, and for many of us it is necessary to do things in a cook-book manner, not understanding what we are doing or why. Explanations such as those that follow are going to be of great value to us as we plod ahead.

arcadian

TUTORIAL (1) SCREEN OPERATIONS, by John Perkins.

The screen is divided into a left and a right side with a movable boundary. The following outputs prevail:

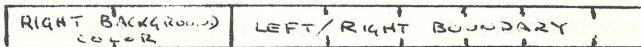
&(0)=right side register Ø	&(4)=left side register Ø
&(1)= " " " 1	&(5)= " " " 1
&(2)= " " " 2	&(6)= " " " 2
&(3)= " " " 3	&(7)= " " " 3



Bally BASIC continually sets &(4) and &(5) to the color/shade defined by BC, and &(6) and &(7) to the color/shade defined by FC. These are fixed while BASIC is in control. But by moving the boundary so that the right side is visible, we can then control 4 different color/shades by using the &(0) thru &(3). Example:

&(0)=30;&(1)=85;&(2)=153;&(3)=125;&(9)=0

Three colors are displayed- listing, background, and 'garbage' at the top. More on this later. The fourth color should be visible as we scroll the text into the upper border area. With &(9) at some other value, such as 10, the screen is divided and the FC and BC commands allow two more colors on the screen. Actually, &(9) has two functions:



The least significant 6 bits set the boundary position (4 pixels or one memory byte per unit). The most significant 2 bits choose the color register associated with the left side background and the right side background. Try &(9)=135.

The 'garbage' mentioned above is actually the stored program, in the screen memory, using the even bit positions.

Each pixel equates to two bits of memory - 4 pixels to an 8 bit byte. The two bits of each pixel can have 4 representations;

- 00 = &(4) left or &(Ø) right
- 01 = &(5) left or &(1) right
- 10 = &(6) left or &(2) right
- 11 = &(7) left or &(3) right

When Bally BASIC sets the screen boundary (&(9)) all the way to the right, then only the left registers &(4) to &(7) are used. Since it also sets &(4) and &(5) to BC, and &(6) and &(7) to FC, only the odd bits of memory show on the screen.

a 00 is the same color as an 01, and a 10 is the same color as a 11. By storing the program in the even bits it can occupy screen memory (as every other bit) and yet be invisible. However, by moving the boundary to the left, the right-side registers are used, and since the program above set these to different colors, the stored program becomes "visible" as the garbage at the top of the screen.

&(10) controls how many raster lines are displayed from memory as opposed to being part of the background. &(10)=204 displays all of memory (RAM) allowing visual inspection of the running program.

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TUTORIAL (2) EXPLANATIONS by Jean Taillefer.

- IF statements will execute as a TRUE condition if the value of the expression results in a value greater than \emptyset . (The expression could be a calculation) If the value is \emptyset or negative, the IF statement regards the condition as FALSE.
Example: IF TR(1) GOTO 100 . will branch to 100 if TR(1) is = 1
IF A GOTO 110 . will branch to 110 if A is greater than \emptyset
- AND may be expressed in many ways. The most common form being
IF A=3 IF B= \emptyset GOTO 120 . will branch to 120 if and only if A=3 and if B= \emptyset
IF(A=3)=(B=0) GOTO 120 . does the same thing
- OR conditions, where you want to jump if either of some conditions are true, can be done by
IF A=3 GOTO 130
IF A=6 GOTO 130
IF A=7 GOTO 130 . meaning that if A is either 3,6,or 7, the program will jump to 130
IF(A=3)+(A=6)+(A=7) GOTO 130 . does the same thing
- Self-starting programs can be made by inserting the line
1: RETURN at the beginning, and use this at the end to store on cassette- NT=1; :PRINT;LIST;PRINT"CLEAR;RUN"

TUTORIAL (3) DATA STORAGE by Bob Weber.

This subroutine would be called up in order to save the program, the registers, and the strings by using a GOTO 9000.

```
9000 :PRINT;LIST
9010 FOR Z = 1 TO 26
9020 TV = Z + 64
9030 PRINT #1, %((20076+(Zx2)) " = ")
9040 NEXT Z
9050 FOR Y = 0 TO N
9060 PRINT #1, "@(", Y, ")=", @(Y)
9070 NEXT Y
9080 PRINT "RUN"
    .less, if you don't have that much
    register storage
    .where N is the number of strings
```

CHECKERS GAME listing by John Collins, 713 Bradford Drive, Ft. Walton Beach, FL 32548 is included. There is an amazing amount of activity in this game, that is comparable to the \$75. 'Checker Challenger'. Before the machine makes a move, it goes thru some steps, and numbers appear to tell you where it is. The code for the steps is:

1. the computer has found that it can jump one of your men
2. checking to see if you can jump it
3. is a corner open?
4. is there an open move?
- 5.& 6. have the computer's men moving either to get kinged or towards and player's man left
7. any move an unkinged computer's piece can make
8. any move

To indicate a double jump, enter the two numbers (of the square you go thru and the landing square) as if it were a single jump only.

Errors see page 47,90) 77

PROGRAM NAME CHECKERS

PROGRAM NAME	Line #	Statement(s)	Line #	Statement(s)	Line #	Statement(s)	PROGRAM NAME
4	2	4 : RETURN; CLEAR.	520	1 F@((U+C-F)=1, 1 F@((U+F))=3; RETURN	1430	qOTO 15ϕϕ	
6			530	6OTO 7ϕϕ	1450	R=S; S=S+2*x J*x X	
8		: PRINT "TB(C).CHECKERS<JOHN	600	L=1; IF@((U+C)-3<ϕ) RETURN	1460	X=1; NEXT X; qOTO 12ϕϕ	
		COLLINS"; qOSUB 3ϕϕϕϕ	610	1 F@((U+F)-3<ϕ) 1 F@((U+C-F))=2;	1470	NEXT X; 1 F((ABS((@,(S))-3))=2;	
50		FOR U=A TO 89; 1 F@((U))<4		=3; RETURN	1500	J=F; J=T; J=-T; qOTO 14ϕϕ	
		GOTO SSSA=U; U=89	620	1 F@((U+F))=3; 1 F@((U+C-F))=1;	1510	GOTO 161ϕ	
55		NEXT U; FOR V=1 TO 8; PRINT		RETURN	1600	@(S)=@(R); S=@(R)=3	
		V; FOR U=A TO 89; 1 F@((U))<4;	630	L=L+1; D=@((U+L*xB)); J.F.	1610	1 F(T)ϕ 1 F(S)<2ϕ; @((S))=1	
		GOTO 91ϕ		D=ϕ; RETURN	1620	1 F(T)ϕ 1 F(S)<2ϕ; @((S))=5	
60		FOR X=9 TO 11 STEP 2; FOR Q=1	640	I.F. D=3>ϕ; RETURN	1630	1 F(T)ϕ GOTO 5ϕ	
		TO 11 STEP -2; J.F@((U))=4 Q=-1	650	I.F. L≠2, I.F. D=3<ϕ J=1; RETURN	1640	T=1.6; OSUB 2ϕϕϕϕ; qOTO 14ϕϕ	
70		B=Q*x X; S=U+B; 1 F@((S))=ϕ	660	qOTO 63ϕ	2000	CLEAR; BOX 25,9,0,9,6,8,6,3	
		GOTO 9.ϕϕ	700	1 F@((U))=5; RETURN	2010	FOR I=12 TO 89; S; 1 F@((I))=ϕ	
75		I.F@((S))#3 GOTO 9ϕϕ	800	J=1; RETURN		GOTO 21ϕϕ	
80		C=B+B; J.F.=Q*x2ϕ; Z=Y*x14ϕ; J=160T0.0969	900	NEXT Q; NEXT X	2020	M=-2.5+(I-(I÷1ϕ))*x1ϕ	
		J=ϕ; qOSUBZ; J.F.=160T0.0969	910	NEXT U; NEXT V	2030	N=-4.5+(I÷1ϕ)*x1ϕ	
90		GOTO 9.ϕϕ	920	BC=B; qOSUB2ϕϕϕ; PRINT	2040	C.X=M-1.2.9; C.Y=N; PRINT#2, I	
100		I.F@((U+C))#3 RETURN	930	4 YOU WIN"; J.A=KP; qOTO 08	2050	I.F@((I))#3 BOX M,9,N,9,7,9,2,9,1	
200		I.F@((S)-Z)ϕ RETURN	940	R=U; Q=-1; NEXT Q; S	2060	I.F@((I))>3 BOX M,9,N,9,2,9,2,3	
220		I.FV=1, S=U+C; J=1; RETURN	950	X=11; NEXT X	2070	I.F ABS(@((I))-3)=2 BOX	
230		FEC(U-B))#3 RETURN	970	V=B; U=89; NEXT U; NEXT V;		M,9,N,9,7,9,4,9,3	
240		I.F@((U-F))#3 S=U-B; U=U-F;		T=-1; qOTO 12ϕϕ	2100	NEXT I; RETURN	
		J=1; RETURN		PRINT#2, J.R, "S"; S=	3000	FOR I=1 TO 16ϕϕ; @((I))=ϕ;	
250		I.F@((U-C))#3 S=U-B; U=U-C;		INPUT" FROM "R; IF S< A A=S		NEXT I; FOR I=12 TO 18	
		J=1; RETURN	1010	I.F@((R))>2 GOTO 1 ϕϕϕ		STEP 2	
260		I.F@((U-B-F))#3 S=U-B-F;	1020	I.F@((R))=ϕ GOTO 1 ϕϕϕ	3010	@((I))=2; @((I+1,1))=2; @((I+2ϕ))	
		J=1; RETURN	1030	INPUT" TO "S; IF@((S))#3		=2; @((I+3,1))=3; @((I+4ϕ))=3	
290		RETURN		GOTO 1 ϕϕϕ	3020	@((I+5,1))=4; @((I+6ϕ))=4;	
300		I.F@((S)-F))#1 RETURN	1040	I.F@((R))#1, 1 F R>S GOTO 1 ϕϕϕ		@((I+7,1))=4; NEXT I; A=67	
310		I.F@((S))=3 J=1; RETURN	1050	I.F((S-R)*(S-R))<122	3030	BC=7; FC=146; RETURN	
320		I.F@((S-Z)*(X-1ϕ))#3		GOTO 1 ϕϕϕ			
		S=5-Z*(X-1ϕ); J=1		I.F T)O 1 F@((S+R)÷2)<4			
330		RETURN	1210	I.F T)O 1 F@((S+R)÷2)<4			
400		I.F@((U+C))#1 F@((U))=4 J=1	1220	qOTO 1 ϕϕϕ			
410		RETURN		J=T; @((S))=@((R));			
500		I.F@((U+C))<3 RETURN		@((S+R)+2)=3; @((R))=3			
510		I.F@((U+F))<3 I.F@((U+C-F))		FOR X=qTO 1 STEP 2			
		=3 RETURN		I.F@((S+J)*X)=3+T GOTO 145ϕ			
				I.F@((S+J)*X)=3+T+T			
				GOTO 145ϕ			

DO NOT ENTER A SPACE BETWEEN LINE UNITS
NO STATEMENT THIS IS DONE BY THE UNIT
USE OF SHADDED AREA IS FOR PWD AND OF STATEMENTS

arcadian

MEMORY DUMPS and LOADERS I have received about 6 programs that 'dump' the data located in the ROM in various languages, and one is included herein that prints its answers in binary. As the others get 'scrubbed', they will be included for your information. What to do with the knowledge you will then have is up for debate.

MEMORY DUMP listing was written by Max Manowsky to yield a binary output for a selected memory location. Brett Bilbray has modified it to give a full 16 bit answer, and added the comments to go with it.

Line #	Statements	Comments
1	MEMORY CONTENTS-BINARY	
2	BY MAX MANOWSKI	
3	MODIFIED BY B. BILBRAY	
10	INPUT D; CLEAR; PRINT#7,D;	
	A=%(D); PRINT#7,A;	
	IF A<0 GOTO 30	
20	GOSUB 1000; GOTO 2000	
30	A=-A; GOSUB 1000; FOR B=1, TO	
	16; IF @B = 48@B = 49; GOTO 50	
40	@B = 48	
50	NEXT B	
60	B=1	
70	@B = @B + 1	
80	IF @B = 50 @B = 48;	
	B=B+1; GOTO 70	
90	GOTO 2000	
1000	FOR B=1 TO 16: @B = A - A DIV 2 * 2 + 48; A = A DIV 2; NEXT B; RETURN	
2000	FOR B=1 TO 1 STEP -1; IF (B=12) +(B=8)+(B=4) TY=32	
2010	TY=@B; NEXT B; PRINT; GOTO 10	

USE OF SHADeD AREA IS FOR 2ND OR
MORE LINES OF MULTILINE STATEMENTS

- line 10 asks for the input for the desired location, the machine prints that location and then the PEEKed decimal number
- line 20 calls for a conversion from decimal to binary, and displays binary
- line 30-90 calls the decimal to binary conversion, performs a 'ones compliment' on the number and calls the display routine
- line 1000 stores the decimal number as a binary in @(X)
- lines 2000,2010 provides the display routine for the binary number

What you will get looks like this arbitrary example:

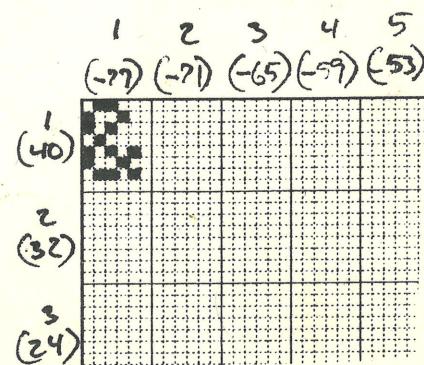
The location I requested is 2049

2049	5727	.decimal
0001	0110 0101 1111	.binary

GRAPH to the right is a portion of a worksheet being developed by Chuck Thomka to identify each pixel's location on the screen for details of figure construction. Note the ampersand & .

Contact Chuck at 1228 West 222 St.,
Torrance, CA 90502

for information as to availability of this worksheet as well as the listing sheets as I use (sample-partial-above)



MEMORY DUMP program by Gary Moser prints its answers in Hexadecimal language. See what you get for the answer to location 0006. If it is 61, then your machine is like mine, and if it is 66, it is like Tom Wood's. If something else, then we have more variants on the street.

RANDOM ART is a quick little moving box program by Ernie Sams.

Has been expanded
see page 49

DO NOT ENTER A SPACE BETWEEN LINE #
AND STATEMENT. THIS IS DONE BY THE UNIT

Line #	Statements
1	RANDOM ART
2	BY E. SAMS
1.0	X=0; Y=0
2.0	INPUT "WIDTH INCREMENT" W
3.0	INPUT "HEIGHT INCREMENT" H
4.0	X=X+W; Y=Y+H
5.0	CLEAR
6.0	IF X>159 W=-W; FC=RND (3.1)×8+4
7.0	IF X<2 W=-W
8.0	IF Y>79 H=-H
9.0	IF Y<2 H=-H
1.00	X=X+W; Y=Y+H
1.1.0	IF X<1 X=1
1.2.0	IF Y<1 Y=1
1.3.0	BOX 0,0,X,Y,3
1.4.0	GOTO 60

Line #	Statements
1	MEMORY CONTENTS - HEX
2	BY G. MOSER
5	GOTO 200
6	C=0
1.0	IF AC0 GOTO 120
2.0	FOR N=1 TO 4
3.0	B=A÷16
4.0	IF RM<10 GOTO 60
5.0	RM=RM+7
6.0	@(5-N)=RM+48
7.0	A=B
8.0	IF C=0 GOTO 90
8.1	A=A+2048
9.0	NEXT N
1.00	TY=@(3)
1.0.1	TY=@(4)
1.0.2	PRINT #1," "
1.0.3	TY=@(1)
1.0.4	TY=@(2)
1.0.5	PRINT
1.1.0	RETURN
1.2.0	A=32767-ABS(A)+1
1.3.0	C=1
1.4.0	GOTO 20
2.0.0	PRINT "MEMORY LOCATION"
2.1.0	INPUT T,U
2.2.0	FOR V=T TO U STEP 2
2.3.0	A=%(V)
2.3.5	PRINT #0,V
2.3.6	PRINT #1," / "
2.4.0	GOSUB 6
2.5.0	NEXT V
2.6.0	GOTO 200

arcadian

MACHINE LANGUAGE PROGRAMMING A further step along the way was taken by Glenn Pogue, who modified the "game over" routine of p. 25, making it print the word ARCADIAN in 2x normal letter size. I have not been able to totally duplicate this feat, I think it lies in the small differences in ROM locations that have previously been noted. The total program is:

See note page 47

```
9 CLEAR
10 A=20180;B=A;C=120
20 X=-43;GOSUB C
30 X=53;GOSUB C
40 X=27672;GOSUB C
50 X=20190;GOSUB C
60 X=-13871;GOSUB C
70 X=21057; GOSUB C
80 X=16707; GOSUB C
90 X=18756; GOSUB C
100 X=20033; GOSUB C
110 CALL (B); STOP
120 %A=X; A=A+2; RETURN
```

.ref p.34"LINE INPUT BUFFER from 20180..."
.lines 20 to 60 call subroutine 52 and define the required parameters for the 70 to 100 part to work, and get back to the BASIC
.lines 70 thru 100 insert the letters per the scheme shown below
X=0,
GOSUB C
.Displays the contents of memory slots A
.POKEs the values of X into memory slots A

To convert the word ARCADIAN into machine language, each character is converted into its hexadecimal equivalent (use chart on p.16.) They are then paired off, each pair is swapped, and the new pair converted into decimal, as follows:

Desired characters	A	R	C	A	D	I	A	N
Hexadecimal conversion	41	52	43	41	44	49	41	4E
Pair off	41	52	43	41	44	49	41	4E
Swap within pair	52	41	43	41	49	44	4E	41
Convert to decimal(use routine on page 36)	21057	16707	18756	20033				

And these are the values of X in lines 70 to 100.

My operation did not give a clear display. There was more material on the screen, some of it seemed to be overprinting. I inserted line 105, X=12336; GOSUB C, to add some known characters (00), and I could then see the first part of line 20 → 20 X = -43 in giant letters.

The program is presented for the experimenters in the audience who would like to have something more unusual. The program has more potential because the root subroutine, 52, has many capabilities.

LETTERS from ARCADIAN subscribers to Bally, detailing what their desires would be in the capability of the Programming Keyboard might help the Bally management to move ahead on this project. The Director of Sales is Mr. J.Nieman, Bally Consumer Products Div., 10750 West Grand Ave. Franklin Park IL, 60131.

SIMON CORRECTIONS: Make the following changes in the program:

Revise line 10 CLEAR:&(0=7;&(1)=7;&(2)=0;&(3)=0;&(9)=30;
NT=0;CX=47;CY=20;PRINT"SIMON";B=7;A=0;CX=47;
CY=-20;PRINT "SCORE:";NT=5

Delete lines 70,80,90,100,160,170

Add lines 70 FOR X=1 TO A

```
80 GOSUB @(X)x1000
155 IF D=1 GOSUB 1000; GOTO 170
160 IF D=2 GOSUB 2000; GOTO 170
164 IF D=3 GOSUB 3000; GOTO 170
166 GOSUB 4000
```

Revise line 150 IF D@X NT=55;MU=33;MU=48;MU=48;NT=3;
FC=0;GOTO10

In lines 1000,2000,3000,4000 delete the -2xA after 1 TO 255

ADS

Six programs available: Horserace,\$3.; TicTacToe,\$1; Craps 2, Startrek, Slot Machine, Connect Four, at \$2. each. All six for \$10. Include a C-30 tape for programming. Or listing for half price. All games except Startrek have graphics. S.Waldinger, 24740 Woodcroft Dr, Dearborn MI 48124

Conversions from Hex to Decimal, Decimal to Hex, and Binary to Hex and Decimal. All on one tape for \$5. Robert Strand 10665 E. FOIX Ave. Norwalk, CA 90650

The listing for Bob Weber's ad last month should have been:
Bob Weber 6594 Swartout Rd. Algonac MI 48001 has the following available
for \$2. each plus a tape long enough to accept 4minutes per program.
Or \$3. each on Bob's tape.

SUB SEARCH	ALIEN PATROL	CALENDAR
SLOT MACHINE	CONCENTRATION	TIC TAC TOE
FLIGHT SIMULATOR	HANGMAN	MATH QUIZ
OTHELLO	MASTERMIND	SPACE CHASE

A total of 21 games are available from Jean Taillefer, 115 Northwestern Ave. Ottawa, K1Y 0M1 Canada, at costs of \$1 for one minute, \$2. for three, and \$3. for a five minute program(you supply the tape). Or the listing is half price. Send for a list of those available.

ARCADE plus 'cades: 2002, 2003, 2004, 3001, 3002, 5002, plus DEMO Basic and DEMO cassette interface.(these will not do the tricks we talk about)
total \$300. D. Choinsky, 1748 Wiese Ln, Racine WI 53406 414-886-9316

Two sets of programs available: Set I GAMES- Cheese Boxes, Random, Siren, Slot Machine, Color Match, Rock/Paper/Scissors, Memory Match, Building Blox
Set II VIDEO ART-Wallpaper, Rnd Line, Rnd Box, Color Box, Scroll 1,2,3, Electric Doily, Color War, Color Wheel, RubberBand, Laser Duel, Spiral, Reverse Box, Perspective Box. Prices are On His Cassette, \$8/Set or \$10/both

On Your Cassette, \$4/Set or \$ 6/both from
D, Stocker 333 Coronado Dr MtVernon, IN 47620

REVERSE CORRECTIONS

Revise line 260 CY=-20;PRINT" YOU WON IN",;TV=T÷10+48;
TV=T-T÷10x10+48;PRINT "MOVES"

270 GOTO10

280 CX=-50;CY=0

-46-

ARCADIAN

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